JACKPILE - PAGUATE

Uranium Mine Reclamation Project

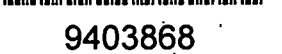
RECORD OF DECISION

DECEMBER 1986

US DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE

BUREAU OF INDIAN AFFAIRS
ALBUQUERQUE AREA OFFICE



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RECORD OF DECISION

This document records the decisions reached by the Bureau of Land Management (BLM), New Mexico State Office and the Bureau of Indian Affairs (BIA), Albuquerque Area Office for the level of reclamation required for the Jackpile-Paguate Uranium Mine.

SUMMARY

Alternatives for reclaiming the Jackpile-Paguate Uranium Mine are analyzed in a Final Environmental Impact Statement prepared by the BLM and BIA and filed with the U.S. Environmental Protection Agency (EPA) on October 31, 1986.

The Final Environmental Impact Statement presents six alternatives for reclamation of the Jackpile-Paguate Uranium Mine. The alternatives are:
1) No Action; 2) Green Book Proposal; 3) Department of the Interior (DOI) Proposal (two options); 4) Laguna Proposal; 5) Anaconda's 1985 Reclamation Plan; and 6) Preferred Alternative.

ALTERNATIVES CONSIDERED

The reclamation alternatives were originally analyzed in a Draft Environmental Impact Statement prepared by the BLM and BIA and filed with the EPA on March 5, 1985. The alternatives consisted of No Action, Anaconda's 1982 Proposal (called the Green Book), the Laguna Proposal, and the DOI Proposal (with two options for dealing with groundwater recovery levels and associated impacts). The Final Environmental Impact Statement modified the alternatives in response to public comments received on the draft. These modifications include the addition of a new plan submitted by Anaconda in 1985 and modification of the Laguna Proposal. The following is a brief summary of the reclamation alternatives analyzed in the Final Environmental Impact Statement. A more complete description of these proposals is given in Tables 1-3, 1-4, and 1-5 of the document.

DESCRIPTION OF ALTERNATIVES

No Action Alternative

The No Action Alternative would mean that no reclamation work would be performed. The area would be secured to prevent unauthorized entry and an environmental monitoring program would be implemented. Additional requests by the Pueblo of Laguna to utilize certain facilities for storage could be accommodated, provided such use would be temporary and deemed safe.

This alternative is not feasible because it does not provide a reasonable measure of protection to public health and safety, and does not reduce environmental impacts to the extent possible. This alternative is included and analyzed only to provide a benchmark that would allow decisionmakers to compare the magnitude of environmental effects for a given range of alternatives.

Green Book Proposal

The Green Book Proposal was originally developed by Anaconda Minerals Company in 1982 but was subsequently replaced by Anaconda's 1985 Multiple Land Use Reclamation Plan on August 19, 1985. The Green Book was carried forward in the Final Environmental Impact Statement for continuity of impact analysis and consistency with the Draft Environmental Impact Statement, but it is no longer endorsed by Anaconda. Under this alternative, the open pits would be backfilled to at least three feet above groundwater recovery levels projected by Dames and Moore, 1983. All highwalls would be scaled to remove loose material. The rim of Gavilan Mesa would be cut back by mechanical means or blasting and the base of the highwall would be buttressed with waste and overburden. Waste dump slopes would be reduced to between 2:1 and 3:1 (horizontal to vertical); most slopes would be terraced. Jackpile Sandstone exposed by resloping would be covered with four feet of overburden and one foot of topsoil. All protore and waste material lying within 200

feet of the Rios Paguate and Moquino would be removed. Facilities would either be removed or cleaned up and left intact. All disturbed areas (pit bottoms, waste dumps, old roads, etc.) would be topsoiled and seeded. Reclamation would be considered complete when the weighted average for basal cover and production on revegetated sites equals or exceeds 70 percent of that found on comparable reference sites. The post-reclamation monitoring period would be a minimum of three years.

DOI Proposal (Monitor Option and Drainage Option)

This alternative was developed by the BLM and BIA. It is based on a series of technical reports, contracted studies and file data. Although similiar to the Green Book Proposal in overall concept, it varies in important details. Because of concerns over the environmental impacts of either ponded water or salt build-up in the open pits, DOI identified two options for treatment of the pit bottoms: 1) a Monitor Option which would backfill the pits with protore, excess material from waste dump resloping and soil cover. Due to the excess material (approximately 19 million cubic yards) generated in this proposal, the estimated backfill elevations of the pit floors could be 40 to 70 feet higher than the Green Book proposed minimum. The pits would remain as closed basins, in which case the potential build-up of salt and saline water in the soils of the pit bottoms would be monitored. If soil problems were observed, additional backfill and revegetation would be required. The monitoring period would be of sufficient duration to determine the stable future water table conditions; and 2) a Drainage Option which would restore the natural mode of overland runoff from the pit areas. Backfill volumes and elevations would be approximately the same as for the Monitor Option, but none of the pits would be left as closed basins. Open channels would be constructed with a gradient equal to or flatter than local natural watercourses to convey runoff from the pit areas to the Rio Paguate. This would avoid ponded water or undrained saline soils on the reclaimed minesite.

For both options, other aspects of reclamation would be the same. Highwall stability techniques would essentially be the same as the Green Book Proposal. With few exceptions, waste dump slopes would be reduced to 3:1, with no terracing. Treatment of Jackpile Sandstone and minesite facilities would be the same as the Green Book Proposal. All protore and waste material lying within 200 feet of the Rios Paguate and Moquino would be removed. In addition, a permanent base or bridge would be constructed on the Rio Moquino. All disturbed areas would be topsoiled and seeded. Reclamation would be considered complete when revegetated sites reach 90 percent of the density, frequency, foliar cover, basal cover and production of undisturbed reference areas. The post-reclamation monitoring period would vary for each parameter.

Laguna Proposal

This alternative was developed by the Pueblo of Laguna in consultation with their technical consultants. In May 1986, the Pueblo provided the DOI with details and/or changes to the Laguna Proposal which are reflected in the Final Environmental Impact Statement.

Under this proposal, all pits would be backfilled 10 feet above groundwater recovery levels projected by Dames and Moore, 1983. In general, the top 15 feet of each highwall would be cut to a 45 degree angle. With few exceptions, waste dump slopes would be reduced to 3:1. All contaminated material within 100 feet of the Rio Paguate would be removed. Waste dumps would be moved 50 feet back from the Rio Moquino and the toes of the dumps would be armored with riprap. Minesite facilities would be handled essentially the same as under the DOI's Proposal except that the rail spur would remain intact. Topsoiling, seeding techniques and other reclamation measures would be the same as DOI's Proposal. The post-reclamation monitoring period would vary from 3 to 20 years.

Anaconda Proposal (1985 Multiple Land Use Reclamation Plan)

Under this alternative the Jackpile and South Paguate open pits would be backfilled to an extent that would prevent chronic free-water ponding with groundwater levels controlled in the backfill by phreatophytic vegetation. The North Paguate open pit would be made into a water storage reservoir by diverting the Rio Paguate through the pit. The Jackpile and North Paguate pit highwalls would be scaled or trimmed back a distance of 10 feet at a 3:1 slope. No additional modification of the South Paguate pit highwall is proposed. Waste dump slope modifications and topdressing requirements would vary. All Jackpile Sandstone and waste material would be moved back 50 feet from the Rios Paguate and Moquino. All buildings and other surface structures would be left intact where it is safe to do so. Revegetation success would be based on a comparison of the entire revegetated area relative to an analogous reference area on a weighted average basis. Revegetated areas would be sampled for the third year after the last seeding or reseeding effort by or for Anaconda and year-to-year thereafter until the success criteria is met.

Preferred Alternative

This alternative was evaluated in the Final Environmental Impact Statement and was developed from revisions to the Draft Environmental Impact Statement, review of public comments, and technical discussions with specialists within the BLM and BIA. The Preferred Alternative presents a combination of reclamation procedures which best meets the Decision Factors on which this Record of Decision is based.

Under this alternative, pits would remain as closed basins. They would be backfilled to at least 10 feet above the Dames and Moore (1983) projected groundwater recovery levels. In general, the top 15 feet of each highwall would be cut to a 45 degree angle. All soil at the top of the highwall would be sloped 3:1. With few exceptions, waste dump slopes would be reduced to 3:1. There are two options for stream stabilization: Option A - remove all material within 200 feet of the Rios Paguate and Moquino and construct a concrete drop structure across the Rio Moquino, and Option B: remove all contaminated material within 100 feet of the Rio Paguate and remove all waste dumps within 50 feet of the Rio Moquino and armor the toes of the dumps along the Rio Moquino with riprap. Facilities would either be removed or cleaned up and left intact. All disturbed areas (pit bottoms, waste dumps, old roads, etc.) would be topsoiled and seeded. Reclamation would be considered complete when revegetated sites reach 90 percent of the density, frequency, foliar cover, basal cover and production of undisturbed reference areas. The post-reclamation monitoring period would vary for each parameter.

DECISION FACTORS

The following reclamation objectives were developed to assist in determining the most appropriate level of reclamation for the Jackpile-Paguate Uranium Mine. These criteria, in order of importance, are as follows:

1. Ensure human health and safety.
2. Reduce the releases of radioactive elements and radionuclei to as low as reasonably achievable.
3. Ensure the integrity of all existing cultural, religious and archeological sites.
4. Return the vegetative cover to a productive condition comparable to the surrounding area.
5. Provide for additional land uses that are compatible with other reclamation objectives and that are desired by the Pueblo of Laguna.
6. Eliminate the need for post-reclamation maintenance.
7. Blend the visual characteristics of the minesite with the surrounding terrain.
8. Employ the Laguna people in efforts that afford them opportunities to utilize their skills or train them as appropriate.

DECISION

Based on the above decision factors, public comments, and analysis contained in the Final EIS, it is the decision of the Bureau of Land Management and the Bureau of Indian Affairs that the level of reclamation to be performed

at the Jackpile-Paguate Uranium Mine will consist of the following measures. As shown by the analysis presented in the Final Environmental Impact Statement, these measures would best stabilize and restore the minesite to productive use and ensure that adverse environmental impacts are reduced to the extent possible. This alternative is also the environmentally preferred alternative.

The scope of this Record of Decision is to determine the level of reclamation to be performed. The party or parties responsible for performing reclamation will continue to be determined by the conditions specified in the leases. Options as to how reclamation will be financed are not included in this Record of Decision. However, at a minimum, the level of reclamation must adhere to the measures listed below. The following measures are approved as the level of reclamation required:

1. Pit Bottoms

A. Backfill Levels

Pits will remain as closed basins. Pit bottoms will be backfilled to at least 10 feet above the Dames and Moore (1983) projected ground water recovery levels as indicated below. A schematic diagram is shown in the FEIS, Appendix A (Figure A-1, DOI Proposal).

Pit	Proposed Minimum Backfill Levels
Jackpile	5939'
North Paguate	5958'
South Paguate	5995'
South Paguate (SP-20)	6060'

A groundwater recovery level monitoring program will be implemented. Additional backfill will be added as necessary to control ponded water. The duration of the monitoring program will be a minimum of 10 years.

B. Backfill Materials

Backfill materials will consist of protore, waste dumps H and J, and excess material obtained from waste dump resloping and stream channel clearing. These materials will be covered with 3 feet of overburden and 2 feet of topsoil (i.e., Tres Hermanos Sandstone or alluvial material).

C. Stabilization

All backfill slopes will be reduced to no greater than 3:1 (horizontal to vertical) Surface water control berms will be constructed within pit bottoms to reduce erosion and retain soil moisture for plant growth. Surface runoff will also be directed to small retention basins in the pit bottoms. All areas in the pits will then undergo surface shaping, topsoil application and seeding as outlined under "Revegetation Methods" below.

D. Post-Reclamation Access

Human and animal access to pit bottoms will be prevented. Livestock grazing will be prevented with the use of sheep-proof fencing due to the uncertainties of predicting radionuclide and heavy metal uptake into plants (forage).

2. Pit Highwalls

A. Jackpile Pit Highwall

The top 15' of highwall will be cut to a 45 degree slope. All soil and unconsolidated material at the top of the highwall will be sloped 3:1. The highwall will be scaled to remove loose debris. A schematic diagram is shown in the FEIS, Appendix A (Figure A-7).

B. North Paguate Pit Highwall

The top 15' of highwall will be cut to a 45 degree slope. All soil and

unconsolidated material at the top of the highwall will be sloped 3:1. The highwall will be scaled to remove loose debris. A schematic diagram is shown in the FEIS, Appendix A (Figure A-7). Additionally, the highwall will be fenced with 6-foot chain link.

C. South Paguate Pit Highwall

The top 15' of highwall will be cut to a 45 degree slope. All soil and unconsolidated material at the top of the highwall will be sloped 3:1. The highwall will be scaled to remove loose debris. A schematic diagram is shown in the FEIS, Appendix A (Figure A-7). Additionally, the highwall will be fenced with 6-foot chain link.

3. Waste Dumps

Waste dumps H and J will be relocated to Jackpile pit as backfill. Most dump slopes will be reduced to 3:1 or less and the dump slopes will be contour furrowed; exceptions are noted in Table I-4 of the FEIS. Dumps which have Jackpile Sandstone on their outer surface and any Jackpile Sandstone exposed during resloping will be covered with 3 feet of overburden and 18 inches of topsoil. Dumps that do not contain Jackpile Sandstone on their outer surface will be covered with 18 inches of topsoil. Berms will be installed on all dump crests to control erosion. All dump tops will slope slightly away from their outer slopes. Dump slopes will be contoured so their toes are convex to prevent formation of major gullies on slopes. Additional surface treatment is outlined under "Revegetative Methods" below. Detailed modifications and treatments are presented in Table I-4 of the FEIS. A schematic diagram is shown in the FEIS, Appendix A (Figure A-9).

4. Protore Stockpiles

All protore will be used as backfill material in pit areas. Backfill will be covered with 3 feet of overburden and 2 feet of Tres Hermanos Sandstone or alluvial material.

5. Site Stability and Drainage

A. Stream Stability

All contaminated soils and fill material within 100 feet of the Rio Paguate west of its confluence with the Rio Moquino will be excavated and relocated to the open pits. For the Rio Moquino, waste dumps S, T, U, N and N2 will be pulled back 50 feet from the centerline of the stream channel. The toes of these dumps will be armored with riprap. A concrete drop structure will be constructed across the Rio Moquino approximately 400 feet above the confluence with the Rio Paguate.

B. Arroyo Headcutting

Arroyos south of waste dumps I, Y and Y2, and the arroyo west of waste dumps FD-1 and FD-3 will be armored as shown in the FEIS, Appendix A (Figure A-13).. Other headcuts encountered during reclamation will also be stabilized by armoring.

C. Blocked Drainages

Waste dump J and protore stockpiles SP-17BC and SP-6-B will be removed to unblock ephemeral drainage on south side of minesite. Two blocked drainages north of FD-1 and F dumps will remain blocked. Remainder of minesite, excluding open pits, will drain to Rios Paguate and Moquino.

6. Surface Facilities/Structures

A. Lease No. 1 (Jackpile Lease)

All buildings on Lease No. 1 will be demolished and removed except for the Geology building, miner training center and buildings at Old Shop and the Open Pit offices. The land surface (except pit highwalls and

natural outcrops) will be cleared of radiological material (e.g., Jackpile Sandstone) until gamma readings of twice background or less are achieved. These areas will then be graded and seeded.

B. Lease No. 4

All structures and facilities associated with P-10 Mine and New Shop, including all buildings, roads, parking lots, sewage systems, power lines and poles will be left. All operational and maintenance equipment, including tools, machinery, supplies will be removed. All permanent structures and land surfaces (except pit highwalls and natural outcrops) will be cleared of radiological material until gamma readings of twice background or less are achieved. These areas will then be graded and seeded. Nonsalvageable contaminated buildings and materials will be removed to the pits for disposal.

C. Access Routes

The four major roads within minesite will be cleared of radiological material and left after reclamation for post-mining use. These access routes include: 1) access road from P-10 and New Shop to State Highway 279; 2) main road through mine; 3) road that passes between housing area and North Oak Canyon Mesa and then proceeds to P-10; and 4) road to Jackpile Well No. 4. All other roads (except on Lease No. 4) will be removed. These areas will then be graded and seeded.

D. Water Wells

Jackpile Well No. 4, P-10 Well, New Shop Well and Old Shop Well, and 3 wells and their associated sheltering structures (near housing area) will be left. The pumps, riser pipe, wiring and water storage tanks will be removed. Wells established for future monitoring purposes will also be left. All wells will be capped to prevent dust, soil and other contaminants from entering the well casing.

E. Rail Spur

The rail spur will be left intact and cleared of radiological material until gamma readings of twice background or less are achieved. Quirk loading dock will be demolished and hauled to the pits.

7. Drill Holes

All drill holes will be plugged according to the State Engineer's requirements. A 5-foot surface concrete plug will also be placed in each hole. Any cased holes will have the casing cut off at the surface. In addition, areas around drill holes will be seeded. Any exploration roads not wanted by the Pueblo will be reclaimed.

8. Underground Modifications

A. Ventilation Holes

Vent holes will be backfilled with waste material (Dakota Sandstone and Mancos Shale) to within 6 feet of surface. Surface casing will be removed, steel support pins installed in walls of vent holes, and sealed with a 6-foot concrete plug from backfill to surface. Areas around vent holes will be contoured and seeded.

B. Adits and Declines

A concrete bulkhead will be constructed approximately 680 feet below portal of P-10 decline. The decline will be backfilled from bulkhead to ground surface with Dakota Sandstone and Mancos Shale.

Sufficient material will be placed over the portal to allow for compaction and settling. The ground surface above the buried portal will be sloped and then top-dressed and seeded. The Alpine mine entry will be bulkheaded and backfilled. Mine entries not previously plugged by backfilling will be covered. Additionally, the H-1 mine adits will be bulkheaded and backfilled and the adits at the P-13 and NJ-45 mines will be backfilled..

9. Revegetation Methods

A. Top Dressing

Following final sloping and grading, pit bottoms will be top dressed with 24", waste dumps with 18" and all other areas within the minesite with 12" of material composed primarily of Tres Hermanos Sandstone (stockpiled at three locations within minesite). In order to meet top dressing volume requirements for the northern portion of the minesite, additional material may be obtained from a topsoil borrow area in the Rio Moquino floodplain comprising 44 acres. For the southern portion of the minesite, additional topsoil borrow material located east of J and H dumps may be needed. Following topsoil removal, disturbed borrow areas, will be contoured, fertilized, seeded and mulched.

B. Surface Preparation

After applying top dressing, areas to be planted will be fertilized, followed by disking to a depth of 8 inches and then contour furrowing.

C. Seeding and Seed Mixtures

Before seeding operations begin, the entire minesite will be fenced to prevent livestock grazing. In most situations, seed mixtures will be planted with a rangeland drill. Broadcast seeding combined with hydromulching may be used on inaccessible sites or if determined to be more feasible than drilling. For both methods, the seed mixture will consist mainly of native plant species possessing qualities compatible with post-grazing use and adapted to local environment (Tables 3-10 and 3-11, FEIS). Following drill seeding, straw mulch will be applied at about 2 tons per acre, and crimped into place with a notched disk.

D. Revegetation Success

Using the Community Structure Analysis (CSA) or comparable method, plant establishment will be considered successful when revegetated sites reach 90 percent of the density, frequency, foliar cover, basal cover and production of undisturbed reference areas (but not sooner than 10 years following seeding). Livestock grazing will be prevented until 90 percent comparability values are met. At the end of the 10-year monitoring period, if an unsuccessful trend is shown retreatment may be necessary to achieve success criteria. In the pit bottoms, vegetation will be sampled annually for radionuclide and heavy metal uptake.

10. Monitoring

The monitoring period will vary for each parameter. Existing monitoring activities to be continued will include: meteorologic sampling, air particulate sampling, radon sampling (ambient), radon exhalation sampling, gamma survey, soil and vegetation sampling, water monitoring and subsidence. In addition, the monitoring program will be expanded to include: radon daughter levels (working levels) in any remaining mine buildings and ground water recover levels/salt build-up in the open pits. The ground water monitoring period will be of sufficient duration

to determine the stable future water table conditions. Refer to Table I-5 of the FEIS for details of the monitoring plan as described under the Preferred Alternative.

11. Security

Control of minesite access and security will continue during reclamation and monitoring activities. However, security during monitoring phase will require cooperation from Pueblo of Laguna and BIA to prevent livestock grazing on revegetated sites.

12. Reclamation Completion

Reclamation will be considered complete when revegetated sites reach 90 percent of the density, frequency, foliar cover, basal cover and production of undisturbed reference areas (but not sooner than 10 years following seeding). In addition, gamma radiation levels must be no greater than twice background over the entire minesite. Outdoor radon - 222 concentrations must be no greater than 3pCi/l. Radon daughter levels (Working Levels) in any remaining surface facilities must not exceed 0.03 WL.

13. Post-Reclamation Land Uses

Limited livestock grazing, light manufacturing, office space, mining and major equipment storage will be allowed. Specifically excluded are habitation and farming.

IMPLEMENTATION

The responsible party or parties as determined by the leases will be responsible for implementing the above reclamation requirements. A Plan of Operations prepared in accordance with this decision will be submitted to the BIA and BLM for approved.

COMPLIANCE

The Deparment of the Interior will monitor and inspect every aspect of reclamation activities to ensure compliance with the above reclamation requirements.

Monte Jordan
Acting State Director
Bureau of Land Management

DEC 05 1986
Date

Sidney L. Mills
Area Director
Bureau of Indian Affairs

DEC 05 1986
Date